EMBRYOLOGY.[1]

RUDIMENTS OF TRUE CALCIFIED TEETH IN THE YOUNG OF ORNITHORHYNCHUS.[2]—Mr. E. B. Poulton, in a brief communication to the Royal Society, announces the discovery of the germs of true calcified teeth in the young of the Duck-bill, of 8.3 centimetres in length. The sections had been prepared by Professor W. N. Parker for Dr. W. K. Parker, who very generously placed them at the disposal of Mr. Poulton, and also urged the latter to publish the account of his discovery, offering, in addition, still other materials, not only of Ornithorhynchus, but also of Echidna. Dr. Parker had laid the sections in question aside for a time (owing to the pressure of other work), to eventually make use of them for the purpose of studying the skull, when Mr. Poulton borrowed the preparations for the purpose of continuing his studies on epidermic structures—with the result announced; and under the circumstances his association with this discovery is, therefore, purely accidental;—yet every true naturalist will appreciate the rare generosity of spirit which Dr. Parker has shown in allowing the independent publication of the results.

Tooth-germs, or, rather, young not-yet-erupted teeth, were found in both jaws; and they were found in such a position as to indicate that they probably represent some part of the molar series in the higher mammals. Examining the sections from the front backwards, the first tooth appeared a little behind the anterior margin of the epithelial elevation, which seems to represent the developing horny plate, which, in the adult, is the functional representative of true calcified teeth. The teeth seem to form a tolerably straight line, extending internally to the horny plates, and passing considerably further backwards than the latter. Owing to imperfections in this part of some of the sections, the author could not determine the exact number of teeth with accuracy; but they appear to be five or six in number on each side. The most anterior tooth-germ is different in character from the others, and is apparently separated from them by an interval which is longer than in other cases. This anterior tooth is the most developed, and its apex extends so far towards the surface of the oral mucous membrane that it nearly touches the epithelium. It is a pointed cylindrical tooth, directed vertically downwards. The four or five posterior teeth are of uniform shape.

The structure of the enamel-cap is entirely normal, except that capillaries are present in the middle membrane (reticulum), intruding from without. The inner layer of long enamel-cells is very

[1] Edited by Prof. Jno. A. Ryder, University of Penna., Philadelphia.
[2] Proc. Royal Society. Vol. XLIII, 1888, No. 263, pp. 353-356.

distinct. No enamel is formed from them at this stage, except, probably, in the case of the most anterior tooth. The dentine-germ was found quite normal in appearance; the depressed, superiorly conical pulp-mass resembles that seen in other Mammalia, and, as in some other forms, this is to some extent embraced around the sides and below by the in-curved lower edges of the dome-shaped enamel organ, which, as in other forms, is superimposed upon the pulp. Dentinal tubules and odontoblasts can be made out in the vicinity of the apex of the pulp-mass.

There can be little doubt that these structures are characteristic mammalian teeth, as supposed by their discoverer. Hertwig's researches serve to show that mammalian teeth are probably in a more ancestral condition than any other organ possessed by the adult. They must have been derived at one time from Prototherian ancestors—and yet existing Prototheria were not known to possess them. Their occurrence in Ornithorhynchus, therefore, supplies the step just where it is wanted; and the fact that they are practically identical with the young teeth of higher mammals is a further indication of the ancestral nature of these structures; for other higher mammalian features represented in the Prototheria are profoundly modified in the latter.

Mr. Poulton, in conclusion, announces his intention of tracing the further fate of the teeth of Ornithorhynchus in later stages, for which purpose Dr. Parker has also placed additional materials at his disposal.

The Ectoblastic Origin of the Wolffian Duct in Chelonia.[1]—In a note with the above title, K. Mitsukuri, of Tokio, Japan, gives a short account of his researches upon the development of the segmental ducts of *Trionyx japonica* (Schleg.) and *Emys japonica* (Gray). The author has found stages which show that the Wolffian duct arises from cells proliferated from the ectoblast, just opposite the region of the intermediate cell-mass. As described by others in other forms, these ducts in Chelonians are found by Mitsukuri to develop from before backwards.

Origin of the Wolffian duct in Lacertilians.—Investigations upon the development of *Lacerta agilis*, *L. muralis*, and *L. viridis* by J. von Perenyi[2] confirms and extends his observations upon the ectoblastic origin of the segmental ducts in this and other forms. Interesting observations are also recorded by Perenyi in the above-cited note on the development of the amnion and allantois of Lacerta.

[1] Zoolog. Anzeiger, XI, 1888, No. 273, p. 111.
[2] Zoolog. Anzeiger, XI, 1888, No. 274, pp. 138–141.

THE ORIGIN OF THE MAMMÆ.[1]—In this note, W. Haacke figures and describes the temporary marsupium of Echidna, and reasserts his claim to the priority of the discovery of the oviparity of the Monotremata. The conclusion is reached that the glands subserving a mammary function in these creatures are developed from sudoriparous glands, while in other mammals the mammary organs have been developed from sebaceous glands. Two apparently carefully-drawn figures of this pouch are given, which disappears after the single ovum is hatched. This pouch is not to be confounded with that described by Gegenbaur and Owen as occurring in this animal.

PHYSIOLOGY.[2]

DOES THE VOLUME OF A MUSCLE CHANGE DURING ITS CONTRACTION?—It has long been a disputed point whether or not the bulk of a muscle alters during its contraction. As far back as the middle of the seventeenth century it was the subject of investigation by Glisson, Borelli, Swammerdam and others, but their methods allowed of errors so great as to make their results nearly worthless. The first to observe by a fairly trustworthy method that the volume of a muscle is slightly lessened during contraction was Erman, about 1812.

Erman's method consisted in placing the muscle in a cylinder filled with water, and, during contraction of the muscle, observing the level of the water in a narrow capillary tube connected with the vessel. With every stimulation of the muscle Erman noted a slight fall of the fluid in the capillary. Some time after this, Johannes Müller suggested that the sinking of the level observed by Erman was caused, not by the diminution in bulk of the muscle itself, but by the compression of the air in the spaces between the fibres. Erman's experiments were thereupon repeated by Marchand and Ed. Weber who eliminated this possible source of error by killing the animals under water. Nevertheless they still observed a fall of the water in the capillary, precisely as Erman had done before them.

In more recent times Kühne has reinvestigated the question, and employed a new method, dependent on the change in specific gravity which must result from any change in volume. By this method Kühne reached negative conclusions, for he could observe no sinking of the araometer when the muscle attached to it was thrown into tetanus.

[1] Biolog. Centralblatt, VIII, No. 1, 1888, pp. 8–16.

[2] This Department is edited by Prof. Wm. T. Sedgwick, Mass. Inst. of Technology, Boston, to whom communications, books for review etc., should be sent.